

United States Department of Agriculture  
Bureau of Entomology and Plant Quarantine

INSECTS OF THE CASTOR-BEAN  
(Compiled from the literature and  
from the records of the Insect Pest Survey)\*

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Introduction

The castor-bean plant (Ricinus communis L.) is distributed throughout the tropical and subtropical world. It grows wild as well as under cultivation, reaching a height of from 30 to 40 feet. In the Tropics it is a perennial, but in the Temperate Zones it becomes an annual, attaining a height of only 8 or 12 feet.

British India is the chief region where the castor-bean is cultivated commercially; it produces 90 percent of the world's output of castor-beans. The plant is also cultivated in the Malay Peninsula, Indo-China, Java, Manchuria, Italy, northern and central Africa, Hawaii, some of the West Indian Islands, Mexico, Brazil, and the United States.

In the United States the plant is cultivated in eastern Kansas, Oklahoma, western Missouri, and southwestern Illinois. In 1918, when the cultivation of the plant was temporarily stimulated by a demand for the oil as a lubricant for war machines, considerable acreage was planted in Florida and some in California.

The castor-bean is grown principally for the oil, but it is also used in coloring of cotton goods and as a medicine. It is extensively grown as an ornamental. The seeds contain a poisonous principle, ricinin, most of which is retained in the pomace after the oil has been pressed out.

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\*This compilation of records was made from the published literature, unpublished manuscripts by J. E. Graf and Max Kisliuk on their work in Florida in 1918, and the files of the Insect Pest Survey. The notes from Costa Rica were made by C. H. Ballou. As so many papers were reviewed for this article, it is not deemed practical to prepare a bibliography. All the abstracts and references are in the files of the Insect Pest Survey and copies of them may be obtained upon request.

The castor-bean plant has attracted attention as an alleged killing agent for insects. During the present grasshopper outbreak in the Great Plains, considerable attention has been given to the plant as a means of control of these insects.

In 1931 the Japanese beetle was reported to have been strongly attracted to the plant and killed by feeding on the leaves. This report received so much publicity that tests were conducted by the Bureau of Entomology of the United States Department of Agriculture to determine the attractiveness and toxicity of the plant. In the cage tests the beetle fed on the foliage to a limited extent only, and there the plant was practically nontoxic; however, in certain field conditions the foliage of the plant appeared to be somewhat toxic.

The literature contains only a few records of insects being poisoned by feeding on the plant. In Manchuria, adults of Autoserica orientalis (Motsch.) are reported as being killed by feeding on the leaves. Many dead beetles of Maladera holosericea (Scop.) were found in the vicinity of the castor-bean plants in the North Caucasus in southern Russia. In Rumania, adults of Bothynoderes punctiventris (Germ.) died from eating foliage. In each instance cited it will be noted that the adults were killed.

Grasshoppers are reported as being killed by feeding on the plant in Australia. There is also a questionable record of grasshoppers being killed by eating seedlings in Turkestan.

In Brazil, the natives plant castor-beans in their gardens to protect their homes from ants. It is also stated that if castor-bean seeds are placed in the glowing fuel in the combustion chamber of ant fumigation apparatus, the fumes form a deposit in the nest that not only kills the ants but prevents others from reinfesting it.

Owing to the increasing interest in the plant, a list of the insect pests has been compiled from the literature and other records. The insects have been divided into two groups, those attacking the plant in the continental United States and those attacking it outside the United States. As the plant is more important in foreign countries, that list is given first place. The localities are those from which the insects have been recorded on the castor-bean. Many of the insects have much more widespread distribution and other food plants. If an insect has been recorded as attacking the plant in the United States and also in foreign countries, it is mentioned in both lists.

#### Insects Attacking the Castor-bean in Foreign Countries

The insects are arranged by orders, the most injurious species being named first. The most important are leaf-feeding caterpillars, of which Ophiusa janata (L.) (= O. melicerta (Drury)) ranks first. The larvae are semiloopers and appear in hordes and entirely strip the foliage from the plant, leaving only the main stalks in young plants and leaf stems and ribs

in the older ones. The insect feeds almost exclusively on this plant, attacking other plants only after the castor-bean has been destroyed. It belongs to the family Noctuidae. It occurs throughout most of the provinces of India, and in Ceylon, the Malay Peninsula, Sumatra, Formosa, and Queensland. It has been questionably recorded from French Equatorial Africa. O. algira (L.) is sometimes, though rarely, found in association with O. janata in India. It also occurs in Egypt. O. catella (Guen.) is very injurious in Africa, defoliating entire plantations in the Transvaal, Italian Somaliland, and the Anglo-Egyptian Sudan. O. arctotaenia Guen. is recorded from Formosa.

Prodenia littoralis (Boisd.) causes severe injury to the castor-bean in India, although it feeds on a number of other plants. It feeds on the leaves, entirely defoliating the plant, and also bores into the stems. It causes more damage as a borer since in that way it kills the entire growing shoot. It occurs throughout the southern peninsula and the hills and plains of India, and in Bihar and Orissa, Burma, Ceylon, the Malay Peninsula, Canton in China, Philippine Islands, Formosa, Egypt, Italian Somaliland, and Rhodesia. P. eridania (Cram.) is injurious in Cuba and attacks the plant in Bermuda.

Heliothis obsoleta (F.) feeds on the seeds in the green capsules, causing considerable injury in the hills and plains of India. In the Baku district of Azerbaijan in the Transcaucasus, it is stated that when castor-bean plants grew in the neighborhood of growing cotton, the cotton was practically free from the insect and also H. peltigera (Schiff.) the castor-bean apparently acting as a trap crop for these insects. H. obsoleta, H. dipsacea (L.), and Heliothis sp. are recorded from the North Caucasus of southern Russia as sometimes causing considerable injury.

The following additional species of Noctuidae have been recorded as causing varying degrees of injury: Tiracola plagiata (Walk.) causes a great deal of leaf injury in the Malay Peninsula; Scotogramma trifolii (Rott.), Euxoa segetum (Schiff.), Plusia gamma (L.), and Barathra barassicae (L.), feed on the leaves in the North Caucasus; Eublemma brachygonia Hmps. injures the fruit in the Italian Somaliland and the Khartoum district of Anglo-Egyptian Sudan; Ozarba brunnea (Leech) causes light injury in the Italian Somaliland; Laphygma exigua (Hbn.) causes some injury in Sicily; and Grammodes geometrica (F.), causes considerable injury late in the season in Sicily.

The pyralidid borer Dichocrocis punctiferalis (Guen.) is one of the most important insect pests of the castor-bean plant in India, ranking along with Ophiusa janata in the amount of damage. It bores into the shoots, especially at the junction of the main stems and the side shoots and leaves, and also attacks the ripening fruit in the seed capsules. It is a pest of regular appearance throughout southern India, Ceylon, the Malay Peninsula, Java, New Guinea, and Taiwan (Formosa).

Phycita diaphana (Stgr.) is very injurious in northern Africa, Algeria, and Morocco. The larvae feed on the leaves and the young flower



buds. P. poteriella Zell. is one of the most injurious insects in the Baju district of Azerbaijan. The larvae feed on and destroy the fruit. The insect occurs in Egypt and Cyrenaica and in the Seychelles Islands.

The larvae of Cryptoblabes gnidiella (Mill.) are sometimes found in association with those of P. poteriella in Egypt.

Loxostege sticticalis (L.) causes serious injury to leaves and stems in the North Caucasus.

Tirathaba rufivena (Walk.) injures fruit in Java.

Ephestia kuehniella Zell. is injurious in Cyrenaica.

An unidentified pyralidid has been recorded as occasionally attacking the foliage in the Khartoum district of the Anglo-Egyptian Sudan.

A lymantriid, Euproctis scintillans (Walk.), is a serious pest in India and the Malay Peninsula, where it defoliates the plant. It is also recorded from the Canton district of China. E. fraterna (Moore) is occasionally a serious pest in southern India by feeding on the leaves. It also occurs in the Malay Peninsula. Several species of Euproctis, of which the most injurious is E. lunata Walk., are of considerable economic importance in the Punjab, where the castor-bean plant has become an important crop. E. flava (F.) probably ranks next. The caterpillars eat the leaves and even devour the small twigs and green cell layers of the stems. E. convergens B. Bak. is sometimes found in the Italian Somaliland. E. producta Walk. is common in Uganda and Zanzibar. E. taiwana (Shiraki) is injurious in Taiwan.

Notolophus posticus (Walk.) now and then assumes destructive proportions as a leaf feeder in India, in Mysore and Ceylon, in the Malay Peninsula, and in Taiwan. N. georgianus (Faw.) has been recorded from Uganda.

Dasychira mendosa (Hbn.) sometimes feeds on the leaves in southern India.

Pseudodura dasychiroides Strand has been recorded from Taiwan.

A nymphalid, Ergolis merione (Cram.), occurs regularly in India, where it has a wide distribution, but is not sufficiently numerous to do serious damage. E. merione taprobana Dbldy. & Westw. occurs in Ceylon.

Vanessa cardui (L.) feeds on the leaves in North Caucasus. Eurytela dryope (Cram.) attacks foliage in Natal and Tanganyika.

Limacodids: Parasa lepida (Cram.) occasionally injures leaves in the southern peninsula of India and Ceylon, and in the Malay Peninsula; Parasa sp. and P. herbifera (Walk.) are recorded from the Malay Peninsula; P. con-socia Walk. from Formosa, and P. vivida (Walk.) from Nyasaland.

Altha nivea Walk. is widespread in the hills and plains of India, but it rarely causes much injury. Thosea cana (Walk.) and T. sinensis (Walk.) occur in Taiwan, Phobetron hipparchia (Cram.) in Rio Grande do Sul, and Nemata lohor (Moore) in the Malay Peninsula. An undetermined limacodid, probably Sibine ophelians Dyar, was collected from Costa Rica.

In the family Arctiidae, Pericallia ricini (F.) is very injurious throughout India; Diacrisia obliqua (Walk.) occasionally becomes injurious in the hills and plains of India and in Assam; Aloa lactinea (Cram.) attacks leaves in Bombay; Amsacta albistriga (Walk.) occurs in southern India, Spilosoma investigatorum Karsch. in the Italian Somaliland, Lichnoptera cavillator (Walk.) in Costa Rica, and Antarctia fusca (Walk.) in Minas Geraes, Brazil.

The castor-bean plant is recorded as being very attractive to Trabala vishnon Lef., a lasiocampid. The insect is a sporadic pest in India and when abundant is very destructive. It also occurs in the Malay Peninsula and Taiwan.

The eri silkworm, Philosamia ricini (Hutt.), is fed on the castor-bean plant indoors, supporting a silk industry throughout Assam. This saturniid has been introduced into all parts of India in a domesticated form. It also occurs in Java. The plant grows extensively in Australia, and it has been suggested that the insect be introduced there for commercial production of silk. P. cynthia (Drury) has been successfully reared from the castor-bean in India, Italy, and Sicily; and it is suggested that it might be reared profitably in Egypt.

Automeris complicata (Walk.), A. zozine Druce, and Rothschildia aurota (Cram.) have been recorded from Rio de Janeiro, and Hylesia lilex Dognin from Lagarto, both in Brazil.

The green seed capsules and leaves are attacked by the tortricids Olethreutes leucotreta (Meyr.) in Uganda and the Italian Somaliland and Eccopsis wahlbergiana Zell. in the Italian Somaliland, Adoxophyes privatana (Walk.) in Taiwan, and Cacoecia rosana (L.) in the North Caucasus.

Leaves are attacked by an unidentified geometrid in Cuba and by Thalassodes digressa (Walk.) in the Italian Somaliland.

Gelechiid leaf miners: Gracilaria sp. causes considerable injury in Egypt, Acrocercops conflua Meyr. in the Italian Somaliland, and A. serriformis Meyr. in Java.

A cossid borer, Xyleutes capensis (Walk.), tunnels the stems in Zanzibar, and a species which is thought to be the same caused a great deal of damage to the older trees in Tanganyika, Natal, and Nyasaland. Zeuzera coffeae Niet. causes some injury in Taiwan.

The following miscellaneous Lepidoptera are minor pests: Plutella maculipennis (Curt.) in North Caucasus; Depressaria ricinella Strand in India; Syntomoides imao (Cram.) in Ceylon; Clania crameri (Westw.) in India; C. variegata formosicola Strand and Stathmopoda theoris Meyr. in Formosa; Emesis mandana (Cram.) in Lagarto, Brazil; Zebronia phenice (Cram.) in Uganda; Nudaurelia wahlbergii (Boisd.) in Natal and Tanganyika; and N. dione (F.) in Uganda.

Several insects in the order Hemiptera have been recorded as very injurious to the castor-bean plant.

Nezara viridula (L.) seems to be the most injurious. It has been recorded from Nyasaland, Egypt, and Costa Rica. An unpublished note from C. H. Ballou stated that he observed the insect feeding in Venezuela in 1938. Plant quarantine inspectors intercepted the insect coming into the United States from Mexico. N. robusta Dist. attacks the plant in Nyasaland.

Acrosternum pallidoconspersa (Stål) causes considerable injury in the Italian Somaliland and in Madagascar. A. marginatum (Beauv.) injures the plant in Costa Rica.

Minor pests include the pentatomids Chrysocoris stollii (Wolff.) and C. abdominalis (Westw.) in the Malay Peninsula, Edessa cornuta Burm. in Costa Rica, and Dalpada smaragdina (Walk.) and Erthesina fullo (Thunb.) in Taiwan.

The lacebug Corythucha gossypii (F.) has been recorded as of economic importance in several of the West Indian Islands, i. e., Puerto Rico, Cuba, Virgin Islands, St. Vincent, Antigua, Grenada, Trinidad, and also in Mexico, Costa Rica, and India. It was observed by C. H. Ballou in Venezuela in 1938. Corythaica monacha (Stål) occurs in Rio Grande do Sul in Brazil, and Gargaphia lunulata (Mayr) in Minas Geraes, Brazil.

Injurious mirids include Poeciloscytus cognatus Fieb., which causes a great deal of damage in the North Caucasus, and Adelphocoris lineolatus (Goeze), which is also widely distributed in the North Caucasus, although the damage is negligible; Helcypeltis bergrothi Reut. and Eurystylus kivuensis Schouteden in the Belgian Congo; and Platytylhellus atripennis (Reut.), which is numerous in Cuba, although the damage is light. An undetermined mirid was swept from the plant in Costa Rica.

A coreid, Hypselonotus atratus Dist., has been reported from Costa Rica. A pyrrhocorid, Eurycophthalmus cinctus (H.-S.), was observed by C. H. Ballou in Venezuela in 1938.

Several leafhoppers in the genus Empoasca are recorded as feeding on the castor-bean plant. E. flavescens (F.) sometimes appears in swarms in India and Egypt, and when the castor-bean plants are young, the leafhoppers suck the juices of the plants to such an extent that the plants fade, curl,



and eventually die. The species is distributed throughout the southern part of the peninsula of India, in Ceylon, and in the Malay Peninsula. E. facialis (Jac.) sometimes causes considerable injury in the Niger Valley of Africa and in the Italian Somaliland and the Khartoum district of the Anglo-Egyptian Sudan. E. notata Mel. occasionally causes injury in India, although it is not usually destructive to the plant grown as a field crop. E. formosana Paoli has been recorded from Taiwan. E. solana DeLong causes a disease of the plant in Hawaii.

Cicadella areolata (Sign.) and Diedrocephala limbaticollis (Stål) were swept from the foliage in Costa Rica. Undetermined leafhoppers are recorded as abundant in the Khartoum district of the Anglo-Egyptian Sudan and Tanganyika.

The treehoppers Entylia sinuata (F.), Spongophorus ballista (Germ.), and Micrutalis sp. were swept from the foliage in Costa Rica.

The fulgorids Dictyophora florens (Stål) and Colpoptera sinuata (Burm.) were swept from the foliage in Costa Rica, and Ormenis quadripunctata (F.), are recorded from Puerto Rico.

Aphids are recorded as being attracted to the plant in India. Myzus persicae (Sulz.) is recorded from the plant by Wilson and Vickery, in Aphididae of the World, 1918, without reference to locality. This species was recorded in the North Caucasus in 1927 and 1928, although it caused no noticeable damage. M. ornatus Laing was intercepted coming from England, on leaves of castor.

A whitefly, Trialeurodes ricini (Misra), is common in India. It sometimes occurs by the thousands on the under surface of the leaves, especially on well-grown plants. It gives entire fields an ashy-white appearance. A species of Trialeurodes occurs in Siam. An undetermined aleyrodid, similar to Bemisia gossypiperda Misra & Lamba, which attacks cotton in the Punjab and in the Sudan, is often present in Iraq, especially where the cotton is overshadowed by the castor plant.

Scale insects are rarely found to be injurious. Saissetia nigra (Niet.) is the most common in India, but it seldom causes much damage. It has also been recorded from the Virgin Islands and the Seychelles Islands. S. hemisphaerica (Targ.) has been recorded from the Virgin Islands and the Canary Islands. S. oleae (Bern.) has been recorded from the Virgin Islands.

Aonidiella aurantii (Mask.) has been recorded from Rio Grande do Sul, Brazil, from Egypt, and from Palestine, and A. orientalis (Newst.) from southern India and the Italian Somaliland.

Aspidiotus destructor Sign. has been recorded from Zanzibar, the Italian Somaliland, and Cuba, and A. hederæ (Vallot) from Syria, Palestine, Rhodes, Portugal, Algeria, and Morocco. A. lataniae Sign. occurs in small numbers in Egypt.

Aulacaspis pentagona (Targ.) occurs in several of the West Indies, including Puerto Rico and the Virgin Islands, and in Bermuda, Canal Zone, Parana in Brazil, Ceylon, and South Africa.

Pinnaspis minor (Mask.) is moderately injurious in Cuba, Bahia in Brazil, the Piura Valley of Peru, and the Seychelles Islands. P. aspidistrae gossypii (Newst.) has been recorded from the Belgian Congo.

The following miscellaneous scale insects have been recorded: Fulvinaria grabhami Ckll., in the Seychelles Islands; P. floccifera (Westw.), occasionally observed on leaves in Egypt; Ceroplastes rusci (L.), in Morocco; Coccus hesperidum L., in Bermuda and Morocco; Chionaspis citri Comst., in British Guiana; Phenacaspis eugeniae (Mask.), in Australia; Lepidosaphes ulmi (L.), in Egypt and Palestine; Chrysomphalus aonidum (L.), in Algeria; Chrysomphalus dictyospermi (Morg.), in Cuba; Icerya purchasi Mask., in Spain, France, Italy, Morocco, Egypt, Palestine, Australia, and New Zealand; I. aegyptiaca (Dougl.), in small numbers in Egypt; Lichtensia viburni Sign., in Devon and Cornwall in England; Pseudococcus adonidum (L.), in Morocco; P. virgatus (Ckll.), in India and the Philippines; P. filamentosus (Ckll.), sometimes, though rarely, found in French Equatorial Africa; Phenacoccus hirsutus Green, in Egypt; and Laccifer lacca (Kerr.), in Assam.

The following have been intercepted at the ports of entry in the United States: Saissetia hemisphaerica (Targ.) from England and Germany; S. oleae (Bern.) from Holland and Italy; Protopulvinaria pyriformis (Ckll.) from Germany; Coccus hesperidum L. from England, France, Germany, Italy, and Japan; Aonidiella aurantii (Mask.) and Aspidiotus destructor Sign. from Colombia; Aonidiella orientalis (Newst.) from China; Pseudococcus citri (Risso) from Bermuda and England; P. maritimus (Ehrh.) from England; and P. comstocki (Kuw.) from Japan.

The most destructive species belonging to the order of beetles is the scolytid Xyleborus fornicatus Eich. This insect injures the castor-bean plant seriously by boring holes in the stems of the living plant. Because of the economic importance of tea, that plant is considered the major food plant, but the castor-bean is the true host plant; it is attacked in higher altitudes than tea can be grown. Experiments were carried on in regard to planting castor-beans in the tea plantations in India as a catch crop, but it did not prove practical, as the insects established in early maturing castor-beans, on emergence, fly back to the tea. The insect is widely distributed in the southern peninsula of India, Ceylon, Bengal, and Java.

Stephanoderes seriatus Eich. has been recorded from the husks of the seed in Bahia, Brazil. Phytorus dilatatus Jac. attacks the leaves in the Malay Peninsula and the Dutch East Indies.

The leaf beetles Nodonota irazuensis (Jac.), N. lateralis (Jac.), and Cryptocephalus trizonatus Suffr. have been recorded from Costa Rica, and C. nigrocinctus Suffr. and Diabrotica graminea Baly from Puerto Rico. Podonta daghestanica Reitt. caused 2 percent injury in experimental plots in North Caucasus. Monolepta bifasciata (Hornst.) occasionally becomes injurious in the Philippines.



Flea beetles: Hermaophaga ruficollis (Lucas) injures the foliage of young plants in India and Epitrix sp. causes similar injury in Cuba.

The scarabaeids Rhizotrogus aequinoctialis (Hbst.), Maladera holosericea (Scop.), and Amphimallon solstitialis (L.) cause serious injury to the castor-bean plant along with other oil-producing plants. Larvae feed on the roots and adults feed on the leaves and seed capsules.

Larvae of Anomala egregia Gahan and A. plebeja (Oliv.) feed on the roots of young plants in the Italian Somaliland.

Adults of Autoserica orientalis (Motsch.) attack the leaves in Manchuria.

Adoretus sp. has been observed by J. C. Bridwell attacking the plant in Hawaii.

Several curculionids injure the plant. Mecistocerus ricini Marshall causes some damage in the United Provinces of India. Psallidium maxillosum (F.) causes a great deal of injury by gnawing the seed capsules and the young leaves in North Caucasus. Diaprepes abbreviatus (L.) and Artipus sp. have been recorded from foliage and Anchonus suillus (F.) from decayed wood of castor-bean plants in Puerto Rico. Geraeus lentiginosus (Boh.), Lechriops auritus (Schon.), and Hypocoeliodes sp. were swept from the foliage, and Cleistolophus similis (Chevr.) was found feeding on the plant in Costa Rica. Bothynoderes punctiventris (Germ.) feeds on the foliage in Rumania. Pycnodactylus mitis (Gerst.) occurs in the Italian Somaliland.

Wireworms including Agriotes spp., Selatosomus spp., and Melanotus spp., damage seedlings in North Caucasus.

A blister beetle, Meloe proscarabeus L., attacks the seedlings in North Caucasus, but causes very little injury.

The tenebrionids Opatrum sabulosum (L.), Gonocephalum pusillum (F.), Platyscelis gages (Fisch.), Pedinus femoralis (L.), and Blaps sp. attack the young plants in North Caucasus, causing considerable injury. P. femoralis also ate the leaves of castor-beans in laboratory experiments carried on in Stavropol, Russia.

The buprestids Sphenoptera arabica Gory and S. fulgens Gory were bred from the woody stems of growing plants in the Khartoum district of the Anglo-Egyptian Sudan, and S. ardens (Klug) causes the same type of injury in Egypt. Vigorous plants are invaded and damaged.

A cerambycid, Dihammus rusticator (F.), has been recorded as being distributed from the Malay Peninsula to Australia and the Philippine Islands without a definite statement as to the locality where the castor-bean plant is attacked, except in Java, where it causes considerable injury.

Mylabrids: Bruchus pruininus Horn deposits eggs in the seed capsules in Hawaii, but the larvae can not survive in the plant; Zabrotes subfasciatus (Boh.) lays eggs on the seeds in Germany, and the report indicates that the larvae die upon eating the cotyledons; and Tribolium castaneum (Hbst.) is not able to survive in seeds, according to records made from examination of samples of seed, husks, and sweepings from the floors of storehouses in various parts of the Soviet Union.

The anthribid Misthosimella ricini Jordon destroys the ripening seed in the Italian Somaliland.

Typhaea stercorea (L.) and Carpophilus dimidiatus (F.) occur in the flowers in Italian Somaliland, but the insects live on waste vegetable matter and are not partial to the castor-bean plant.

There are very few records in the literature of damage to castor-bean plants by grasshoppers. The insects feed abundantly on the seedlings and to some extent on older plants in Turkestan; they also attack the plant in Australia. Chrotogonus trachypterus (Blanch.) occurs sporadically in the plains and the lower slopes of the hills in India, causing considerable damage when numerous. Cyrtacanthacris tatarica (L.) is injurious in southern India and in the Italian Somaliland. Zonocerus elegans (Thunb.) is injurious in Tanganyika.

Schistocerca gregaria (Forsk.) causes serious injury in the Italian Somaliland, but in Senegal, even when swarms were observed to damage a variety of other plants, the castor-bean plants were not attacked. S. impleta (Walk.) was swept from the plants in Costa Rica. Swarms of S. paranensis (Burm.) sometimes attack the castor-bean plants along with other plants in Venezuela.

The tettigonids Conocephalus cinereus Thunb. and Microcentrum sp. were swept from the foliage and Syntechna tarasca (Sauss.) was observed feeding in Costa Rica.

A big brown cricket, Brachytrupes portentosus (Licht.), feeds on practically all plants in India; it fed on shoots and leaves of the castor-bean in a laboratory there.

Thrips: Scirtothrips dorsalis Hood was originally described from shoots of castor-beans and chilies in southern India. Anaphothrips alternans (Bagn.) was collected from the leaves in Italian Somaliland. Retithrips syriacus (Mayet) breeds in the foliage in Egypt. Parthenothrips dracaenae (Heeger) was intercepted at a port of entry into the United States on castor-bean from England.

Among the dipterous insect pests of castor-bean the following have been recorded: Chaetodacus correctus Bezzi in India; Camptomyia ricini

Felt was originally described from dry castor-bean stems from India; Melanagromyza ricini de Meij. attacks seedlings in Java.

The larvae of an undetermined sawfly have been observed feeding in Costa Rica.

Termites cause serious injury in India.

Ants, Formica rufibarbis F., F. cinerea Mayr, Lasius niger aliena (Foerst.), and Tetramorium caespitum (L.), taken together, damaged 17 percent of the plants in experimental plots in North Caucasus.

The common red spider, Tetranychus telarius (L.), is a serious pest of the plant in Cuba and India and has been recorded, with no statement as to the severity of the damage, in Java, Formosa, Iraq, Palestine, the Khar-toum district of Anglo-Egyptian Sudan, and Egypt. T. telarius russeolus Koch causes considerable injury in Sicily. T. bioculatus Wood-Mason occurs in India and Anychus orientalis Zacher in Palestine. An undetermined red spider mite causes some damage in Costa Rica. Bryobia sp. has been observed on the plant in Cairo, Egypt.

#### Insects Attacking the Castor-bean in the United States

The outstanding record of damage to the castor-bean by an insect in the United States was the outbreak of the southern armyworm, Prodenia eridania (Cram.), in Florida in 1918. The insect appeared suddenly and threatened the new industry. Extensive plantations were defoliated. The Bureau of Entomology and the entomological agencies of the State of Florida cooperated with growers in combating the insect, and the losses were checked. The insect was also observed in southern Georgia during the season. Prodenia ornithogalli Guen. and P. dolichos (F.) were found in association with P. eridania (Cram.) in Florida, and P. ornithogalli was also taken in southern Georgia.

Heliothis obsoleta (F.) was fairly common in Florida. It fed on the green fruit chiefly, although it was sometimes found feeding on the leaves. It also occurred in southern Georgia. The insect has been previously recorded from the plant in the United States. Heliothis virescens (F.) was taken in Florida.

Laphygma frugiperda (A. & S.) caused considerable injury in Florida late in the season of 1918. Damage was reported from other places in the South, without definite location or amount of damage. L. exigua (Hbn.) attacked the leaves in the Sacramento Valley in 1918, when the castor-bean was extensively planted in California.

An unidentified cutworm attacked the seedlings in northern California in 1918.



Two noctuid caterpillars, Amyna octo (Guen.) and Monodes nucicolora Guen., were observed feeding in southern Florida in 1918.

Papaipema nebris nitela (Guen.) was reported from West Virginia in 1922.

Pyroderces rileyi (Wlsm.) caused considerable damage in Florida in 1918. A pink caterpillar, probably this species, has been recorded from Cuba.

Hemerocampa leucostigma (A. & S.) was recorded from the plant in the United States without reference to locality.

Two limacodids: Megalopyge opercularis (A. & S.) was recorded from Florida, and Sibine stimulea (Clem.) was recorded from Florida and reported as completely destroying an ornamental planting in Washington, D. C.

Callarctia phyllira (Drury) was taken in Florida.

The sphingiids Celerio lineata (F.) and Erinnyis ello (L.) were collected late in the season of 1918 in Florida.

An unidentified deltoid caterpillar was found feeding in Florida.

The lacebug Corythucha gossypii (F.) caused considerable injury in Florida.

The pentatomid Acrosternum hilare (Say) was recorded from northern Florida.

Euschistus servus (Say) was collected on the plant and believed to be feeding on it.

Nezara viridula (L.) caused considerable damage over a wide area in Florida in 1918.

The leafhopper Empoasca fabae (Harr.) caused some injury in Florida in 1921.

An unidentified green aphid was observed in Florida.

Aonidiella aurantii (Mask.) was recorded from Texas and California and Aonidiella citrina (Coq.) was identified from specimens from Texas.

Aonidiella orientalis (Newst.) has been recorded from Florida.

Pinnaspis minor (Mask.) was taken in Florida.

Icerya purchasi Mask. was taken in Florida and California.

Pseudococcus citri (Risso) was identified from material collected from a greenhouse in Ohio.

A mealybug, Pseudococcus sp., was observed in Florida.

The Japanese beetle, Popillia japonica Newm., has been recorded from Pennsylvania and New Jersey.

Blapstinus sp. caused considerable injury in southern California in 1918.

An adult of Araecerus fasciculatus (Deg.) emerged from a castor-bean seed collected in Texas. This insect has been intercepted in the United States in seed from Brazil.

A dermestid, Trogoderma tarsale Melsh., has been found living in castor-bean seeds in the United States.

The lubber grasshopper, Romalea microptera (Beauv.), has been recorded in Florida, and Brachystola magna (Gir.) was reported as causing considerable injury in Texas.

Schistocerca americana (Drury) caused considerable injury in the Everglades district of Florida, and this species, together with S. alutacea (Harr.), was common throughout the State all summer.

The following miscellaneous Orthoptera have been collected in Florida: Chortophaga australior R. & H., Conocephalus fasciatus (Deg.), Phaneroptera sp., Scirtetica marmorata picta (Scudd.), Orocharis saltator Uhl., and Odontoxiphidium apterum Morse.

The thrips Gnaikothrips uzeli Zimm. was found feeding in small numbers in Florida and Thrips nigropilosus Uzel was taken in a greenhouse in New York.

Tetranychus quinquenychus McG. attacked the plant in Florida

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